



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/693,064

10/23/2003

Phillip W. Barth

10021090-1

2224

7590

10/17/2005

AGILENT TECHNOLOGIES, INC.

Legal Department, DL429

Intellectual Property Administration

P.O. Box 7599

Loveland, CO 80537-0599

EXAMINER

DANG, TRUNG Q


ART UNIT

PAPER NUMBER

2823

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/693,064 | Applicant(s) BARTH, PHILLIP W.  | |
| | Examiner Trung Dang | Art Unit 2823 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-11, 13-18, 21-36 and 38-42 is/are rejected.
- 7) ☒ Claim(s) 5, 12, 19, 20 and 37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>9/26/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-4, 6-11, 13, 15, 17, 21-25, 35-36, 38-39, and 41-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Bloom et al of record.

With reference to Fig.1A and its description, the prior art teaches a nanoaperture chip comprising:

a first region comprising a diagram 16, the diagram comprising a silicon nitride material (500 nm thick), the diagram having a top surface and a bottom surface;
a second region comprising a second insulator material of silicon oxide laterally

surrounding the first region and having an upper surface substantially flush with the bottom surface of the first region (diagram 16);

a substrate region 18 comprising a semiconductor material supporting the first region 16, the semiconductor material comprising a rigid frame laterally surrounding the diagram (Fig. 1B);

a substrate cavity region 36 beneath the diagram;

a third region 12 (15-35 μm thick; see col. 10, lines 55-59) comprising a third insulator material, the third region being disposed atop the diagram, the third region 12 being substantially thicker than the diagram 16 and having a third cavity 22 therethrough exposing a portion of the top surface of the diagram, the exposed portion of the top surface of the diagram being suitable for fabrication of one of a microscale and a nanoscale device 24 (see col. 5, lines 38-39 for the nanoaperture as small as a few nm to a mm in diameter. See col. 7, lines 31-33 for the material of the diagram 16).

Note that, although not shown in Fig. 1A, after the substrate cavity 36 is formed, the exposed semiconductor is oxidized to form about 1.1 micron of oxide (col. 9, lines 23-26; col. 10, lines 52-55), thus an oxide layer is formed on the sidewall 38 of the recess 36, which oxide layer reads on the claimed second region. Since the walls 38 of the silicon substrate region 18 surrounding the first region comprising diagram 16, the aforementioned oxide layer formed on the sidewalls are also surrounding the first

region. Furthermore, since the silicon sidewalls 38 (see Fig. 1A) is oxidized to form about 1.1 micron of oxide, the upper surface of oxide layer is substantially flush with the bottom surface of the diagram 16 (see Fig. 1A wherein an oxide layer is formed on the sidewalls 38), and this oxide layer is substantially thicker than the diagram 16.

For claims 6, 22, 38 and 41 the oxide layer noted above reads on the claimed fifth material.

For claim 7, 23, 39 and 42, silicon nitride layer 20 reads on the claimed sixth region because the term "atop" is a relative term depending on the orientation of the structure. For example, when the structure of Fig. 1A is rotated upside down, layer 20 becomes atop substrate 18.

For claims 24 and 25, see Fig. 1C and col. 6, lines 44-61 for the claimed electrical leads.

For new claim 35, see col. 10, lines 55-59 for the teaching that polyimide layer 12 (third region) is formed to reduce the capacitance, i.e., the polyimide layer 12 provides for low-capacitance across the top surface of the diagram when power is applied to electrodes 46 (see Fig. 1C).

Claim Rejections - 35 USC § 103

3. Claims 14, 16, 18, 24, 26 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloom as above in view of Fishman et al. of record.

Bloom teaches a structure as described above, except for the thicknesses of

the diagram 16, the third region 12, the second region (the oxide layer mentioned above). However, the determination of such thicknesses would have been obvious to one of ordinary skill in the art because it is well settled that the difference in thickness will not support the patentability of the subject matter encompassed by the prior art unless there is evidence indicating such thickness is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation." See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d (Fed.cir), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the claimed thickness range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in the claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d, 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990).

For claims 24, 26 and 40, Bloom differs from the claim in not disclosing a microfluidic lead as claimed. Fishman teaches a microfluidic channel 76 that is integrated with a nanoaperture chip similar to that of Bloom to provide fluid flow to and from recess 36 and nanoaperture 24 (para. [0112] and Fig. 7B).

It would have been obvious to one of ordinary skill in the art to modify the

teaching of Bloom by intergrating the microfluidic channel 76 comprising microfluidic leads 80, 82 as suggested by Fishman because doing so would form a mean to provide fluid to recess 36 of the nanoaperture chip 10.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The use of two verbs "has is" in claim 4 does not make sense.

Claim 11 when read back to claim 4 renders the limitation "the fourth region" lacking antecedent basis.

Allowable Subject Matter

6. Claims 5, 12, 19-20, and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The claims are indicated allowable over prior art of record for the same reason noted in the first Office action.

Response to Arguments

7. Applicant's arguments filed 7/22/05 have been fully considered but they are not persuasive.

In page 11 of the Remarks, applicants argues that "Any oxide layer present on element 18 of Fig. IA will have this recited structure, i.e., it will not laterally surround the first region and have an upper surface that is substantially flush with the bottom surface of the first region." The examiner respectfully disagrees for the reasons pointed out in the body of the rejection.

Conclusion

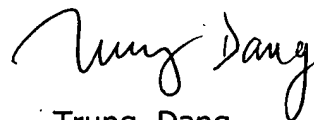
8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Trung Dang
Primary Examiner
Art Unit 2823

10/17/05